

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) Publication number:

**0 657 357 A1**

(12)

**EUROPEAN PATENT APPLICATION**  
published in accordance with Art.  
158(3) EPC

(21) Application number: **94903036.5**(51) Int. Cl.<sup>6</sup>: **B65B 67/12**(22) Date of filing: **22.12.93**(86) International application number:  
**PCT/JP93/01852**(87) International publication number:  
**WO 95/01281 (12.01.95 95/03)**(30) Priority: **30.06.93 JP 41131/93 U**  
**26.11.93 JP 321070/93**  
**26.11.93 JP 321071/93**(43) Date of publication of application:  
**14.06.95 Bulletin 95/24**(84) Designated Contracting States:  
**DE ES FR GB IT NL**(71) Applicant: **KABUSHIKI KAISHA MURAHARU**  
**SEISAKUSHO**  
**17-19, Onodai 5-chome**  
**Sagamihara-shi,**  
**Kanagawa 229 (JP)**  
Applicant: **NIIKURA SCALES CO., LTD.**  
**2, Kanda-Tsukasacho 2-chome,**  
**Chiyoda-ku**

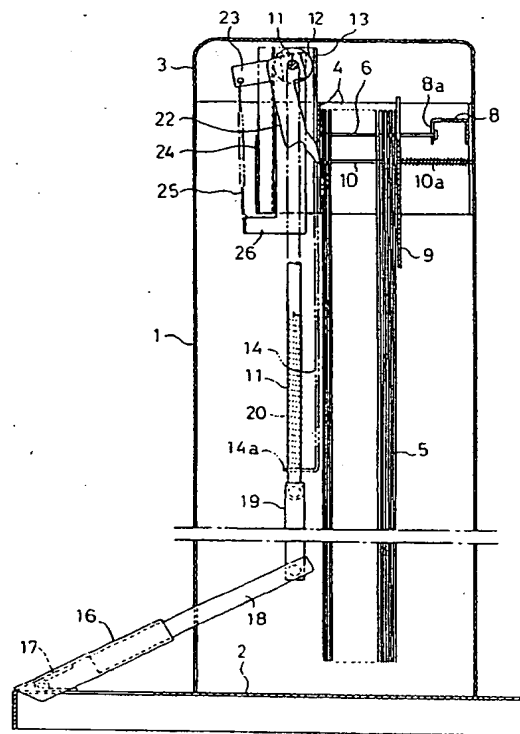
**Tokyo 101 (JP)**  
Applicant: **KABUSHIKI KAISHA YAKULT**  
**HONSHA**  
**1-19, Higashishinbashi 1-chome**  
**Minato-ku**  
**Tokyo 105 (JP)**

(72) Inventor: **MURAKAMI, Toshiyuki, 17-19, Onodai**  
**5-chome**  
**Sagamihara-shi**  
**Kanagawa 229 (JP)**(74) Representative: **Leale, Robin George et al**  
**FRANK B. DEHN & CO.**  
**Imperial House**  
**15-19 Kingsway**  
**London WC2B 6UZ (GB)**(54) **APPARATUS FOR GETTING AN UMBRELLA RECEIVED INTO AN UMBRELLA COVER.**

(57) An object of the invention is to provide an apparatus which is simple in construction without the need of a motor and the like and is capable of easily and positively getting an umbrella received into an umbrella cover. To this end, the apparatus for getting an umbrella received into an umbrella cover according to the invention comprises a body (1) for receiving a number of umbrella covers, a movable support member (11) vertically movably provided in the body (1), a foot-operated pedal (16) for moving the movable support member downward, and an opening operating lever (22) for opening the opening

portion of the umbrella cover by interlocking with the downward movement of the movable support. As a result, it is possible according to the invention to easily get an umbrella received into an umbrella cover. Also, since any motor and the like are not used unlike usual cases, it is possible to reduce manufacturing cost and to use the present apparatus even in a place where any power supply is not available. Besides, the present apparatus is quite practical because any power cable does not interfere with our movements and there is no fear of leakage of electricity.

Fig. 4



## Industrial Field

This invention relates to a storage device for wet umbrellas that automatically wraps an umbrella and places it in sacks. It can be used, for example, at an entrance of hotels, shops and department stores, so that when it is raining, wet umbrellas can be adequately handled and stored.

## Prior Art

When it is raining, synthetic resin sacks (plastic sacks) have traditionally been used to wrap wet umbrellas in order to avoid wetting cloths, floors or goods, while the customers walk around inside hotels, shops or department stores together with their wet umbrellas.

A wide variety of devices, which can open the openings of storage sacks automatically and store umbrellas by just inserting them into the openings, have been proposed to ease the storage operation smoothly. For example, such devices are proposed in Japanese Patent Application No. 60-134817, Japanese Utility Model Publication No. 62-125708 and Japanese Patent Application No. 4-31222.

In the prior art, as mentioned above, it is necessary to include means for absorbing by negative pressure suction, a number of links and/or cam mechanism in order to provide a means for opening each of storage sacks, and therefore, constructions of the prior art became complex in general.

At the same time, since a vacuum pump or a motor is used, the production cost is expensive. And also, such devices cannot be used where a power source is not positioned near the installed devices. Besides, power cords are hindrance and there is a danger of a short circuit when these devices are operated when it is raining.

Furthermore, in the prior art, since a number of storage sacks are simply piled up to fill them in the storage device, it is often difficult to store them due to dispersion thereof. In connection with this problem, in order to carry or retain such storage sacks before they are used in the storage device, involves extra labor or other costs.

In consideration of the aforementioned problems, the present invention is proposed to solve such the problems and to provide a simple structured device so that umbrellas can easily be stored in storage sacks.

## Summary

To attain the aforementioned objections, the storage device of the present invention is comprised of:

a body for filling a number of storage sacks therein;

a movable support member being arranged in the device body and being movable in vertical directions;

a foot pedal for lowering said movable support member; and

open control levers that open the storage sacks in connection with the descending motion of said movable support member.

In the present invention, at first a number of storage sacks are stored in a box and the box is filled in the device's body and said storage sacks are suspended by means of a hanger in order to store themselves in said box (that is, in order to store said storage sacks in said box).

In addition, according to the present invention, said open control levers are structured separately so that a pair of levers move and rotate independently relative to said movable support member. A means for moving and rotating each open control lever in a direction, in which direction each of said levers contacts with said storage sacks, is preferably provided separately. In this case, for example, a spring is preferable. Besides, said open control levers can be comprised of bucket-shaped members made with a slippery material (e.g. resin material such as plastic). The aforementioned device body is not limited just by its case. It can be structured by pillars and transparent members can be arranged between the pillars.

According to the structure of the present invention, when the foot pedal is pressed, the movable support member is lowered and the open control levers open the storage sacks in connection with such descending motion of said movable support member. And then, wet umbrellas can be stored in the storage sacks by inserting each one into each opening of the storage sack.

In the present invention, according to the preferred embodiments of the open control levers, in case that said open control levers are structured separately, a pair of levers move and rotate independently relative to said movable support member respectively, and in case that the means for moving and rotating each open control lever in a direction, in which direction said open control levers contact with the storage sacks, is structured separately and independently each other, said opening can open exactly although misregistration of said opening is generated.

Besides, in case that a number of storage sacks are stored in a box and the box is filled into the device body, or in case that a number of storage sacks are stored in said box by suspending said storage sacks with a hanger, a large number of storage sacks can be easily stored in the device body collectively and rapidly. Additionally, since they are packed in one box, it is easy to carry or store many sacks before they are filled in the

storage device. Furthermore, the required costs can be minimized.

In addition, in case that said open control levers are constructed separately and are constructed as a pair of levers moving and rotating independently relate to said movable support member respectively, and in case that the means are constructed separately and independently relative to each lever, each open control lever moves and rotates in such a direction as make contact with the storage sacks. Since each lever independently moves and rotates to open the storage sacks in connection with the descending motion of the movable support member, and then, the pair of levers enter into the openings of storage sacks to open them, said opening can be opened exactly in despite of any misregistration generated around the opening.

In the present invention, in case that said open control levers are made of bucket-shaped members being made of slippery materials such as resin material (e.g.) plastic, integrally, the insertion of umbrellas can be easier and with greater certainty.

#### Brief Description of the Drawings

Followings explain the preferred embodiments of the present invention referring to attached drawings, in which:

Figure 1 is an oblique section view showing a preferred embodiment of the storage device for umbrella sacks of the present invention;

Figure 2 is an enlarged plan view showing the embodiment of Figure 1 in a state of opening the upper cover;

Figure 3 is a longitudinal front view of the embodiment shown in Figure 1;

Figure 4 is a longitudinal side view of the embodiment shown in Figure 1;

Figure 5 is a deal oblique section view of a pivot;

Figure 6(a) and 6(b) are a front view and a section view of the storage sack, respectively;

Figure 7(a) to 7(c) are explanatory drawings of storing operation;

Figure 8(a) and 8(b) are a front view and a section view of the storage sack, respectively;

Figure 9 is a visual oblique section view;

Figure 10 is an oblique section view of the member for suspending the storage sacks and for retaining them in a box;

Figure 11 is an oblique section view showing a box being filed in the storage device;

Figure 12 is a horizontal section view of a device body shown in Figure 11;

Figure 13 is an oblique section view of an embodiment which is other from the embodiment

being shown in Figure 8 to Figure 12;

Figure 14 is a cross-sectional plan view of the other embodiment of the present invention;

Figure 15 is a cross-sectional front view of the embodiment shown in Figure 14;

Figure 16 is a cross-sectional side view of Figure 13 and Figure 14;

Figure 17 is a partial side view showing a state of anchoring;

Figure 18(a) and 18(b) are a plan view and a side view of a bucket-shaped member, respectively.

Figure 19 and Figure 20 are explanatory drawings showing different phases of the storing process.

#### Embodiment

In Figure 1 to Figure 4, the character (1) is a quadratic prismshaped device body situated on a bed plate (2); closing cover (3) is installed on top of the device body (1). As shown in Figure 2 and Figure 4, a fixed support base (4) is mounted inside of the upper device body (1); a hanger (6), which is suspended to retain storage sacks (5), is set on the fixed support base (4).

As shown in Figure 2, the hanger (6) is comprised of a bar and the like in the form of a box (top-open rectangle-shaped); the base (6a) is anchored to a hook (not illustrated) and then mounted on a fixed support base (4); and the hanger (6) is installed by hitching both ends (6a, 6b) to anchor holes (8a) of support member (8) fixed to the fixed support base (4) for easy removal.

On the other hand, as shown in Figure 6, the top part of the storage sack (5) has an opening (5a); the upper end (51a) of the fore side (51) of the opening is folded forward in a U-shape; the upper end (52a) of the rear side (52) is projected above that of the fore side (51); and a pair of locking holes (5b) are provided at the upper end of the projected portion.

As shown in Figure 2 and Figure 4, a number of storage sacks are suspended and are held by inserting the opposing member (opposing arm) into each locking hole (5b) of the storage sacks. A movable pressure plate (9) is located along a pair of guide bars (10, 10) on the rear face of storage sacks (5); and the pressure plate (9) is constantly pressed against the rear face of storage sacks (5) by a coil spring (10a) penetrating into each guide bar.

As shown in Figure 3 and Figure 5, the guide members (14, 15) are mounted ahead of said fixed support base (4); a movable support member (11) in an inverted L-shape (front view) is penetrated for storage to move vertically in holes (14b, 15b) formed on the horizontal arms (14a, 15a) of such

guide members. Besides, a roller (12) is provided at the upper end of the movable support member (11) to rotate freely; the roller (12) is arranged along with a box type guide rail (13) mounted ahead of the fixed support base (4) to move it vertically.

A foot pedal (16) is provided on said bed plate (2) to lower said movable support member (11). As shown in Figure 4, the foot pedal (16) is mounted or installed by a hinge (17) to move vertically on the bed plate (2). A lever (18) is integrally mounted to the pedal (16); the lever (18) is connected to the lower end of said movable support member (11) through a link (19).

In Figure 4, the character (20) is a return spring being provided to return the movable support member (11) above; the return spring (20) is arranged a position between a spring bearing (21) and a horizontal arm (14a) of said guide member (14) in a contracted condition; said spring bearing is comprised of a clip or similar and is mounted to the movable support member (11).

In addition, a pair of open control levers (22, 22) are rotatably provided on the upper central position of said movable support member (11); said levers (22, 22) enter into the openings (5a) of storage sacks and open the openings (5a). Both ends of said levers (22, 22) are integrally connected in a bottom-open rectangle-shape as in the illustrated example.

A moving control arm (23) is integrally provided on one end of both levers (22, 22) to rotate said levers (22, 22); a contacting plate (24) is provided under the arm (23) integral to said guide rail (13); the contacting plate (24) moves to rotate both levers (22, 22) in clockwise direction in Figure 4 by contacting with said arm (23).

The character (25) represents a coil spring; the coil spring (25) is set as a tension coil spring between said moving control arm (23) and the spring bearing (26) connected vertically to one end of the movable support member (11) so it can rotate freely. The lower end of said open control levers (22, 22) move and rotate constantly in such a direction as storing sacks (5).

Besides, the lower end of the open control lever (22) can constantly be moved to rotate in such a direction as storing sacks (5) by locking one end of a helical spring to the movable support member (11) and by locking the other end of the spring to said open control lever (22); in this case, the helical spring and the like can be arranged around the movable support member (11) close to said open control lever (22).

According to the aforementioned structure, as conventionally shown in Figure 7(a), the movable support member (11) and the pedal (16) are pushed up by the return spring (20) to the ascending

position shown in Figure 3 and Figure 4. As a result, the lower ends of the open control levers (22, 22) are placed above that of the openings (5a) of the storage sacks (5).

When the pedal (16) is pushed in the same manner as mentioned above, the movable support member (11) is lowered against the return spring (20). Then, as shown in Figure 7(b), the end (22a) of the open control lever (22) is entered into the opening (5a) of storage sack (5); in this case, as illustrated, the end (22a) of said lever (22) can be entered into the opening (5a) accurately when the upper end (51a) of the fore side (51) of the opening (5a) is folded.

In case that the end (22a) of said open control lever (22) is entered into said opening (5a) up to the specified depth, as shown in Figure 7(b), the aforementioned moving control arm (23) will contact the upper end of the contacting plate (24). In the same state, when the open control lever (22) continuously lowers (descends) together with the movable support member (11), each open control lever (22, 22) rotates in clockwise direction against the rotating spring (25) around a fulcrum at a contacting point of said contacting plate (24) in order to open the opening (5a) of storage sack (5).

In addition, in the case that a concave area (22b) [See Figure 7(c)] is formed close to the end of the open control lever (22) to enter the upper part (51a) of storage sack (5) into such concave area (22b), removing the upper part (51a) from said lever (22) can be avoided when rotating the open control lever (22).

When the opening (5a) of storage sack (5) is open, insert an umbrella into the storage sack (5) from between open control levers (22, 22) to store it.

The sack (5) in which an umbrella is stored can be removed from the hanger (6), tearing the upper locking holes (5b) of the storage sack (5) by pulling the sack out and lowering the device body (1). Thus the sack wrapping an umbrella can easily be removed from the device body (1).

When foot is released from the foot pedal (16) after an umbrella wrapped in storage sack is taken out, the movable support member (11) and the pedal (16) will return by the return spring (20) to the state shown in Figure 3 and Figure 4; and simultaneously the open control lever (22) will return by the rotating spring (25) to the state shown in Figure 7(a) being in a standby state.

As mentioned above, according to the embodiment shown in Figure 1 to Figure 7, umbrellas can easily be stored into each storage sack completely without using a motor or a vacuum pump and the like in order to open the openings of storage sacks easily and completely.

The other embodiment is explained as follows referring to Figure 8 to Figure 12. According to the embodiment shown in Figure 8 to Figure 12, a number of storage sacks (104) are firstly stored in a box (105); and the box in which a number of storage sacks are stored is charged in a device body (101).

A storage sack used in the embodiment shown from Figure 8 through Figure 12 is shown in Figure 8(a) and 8(b). The storage sack (104) comprises a plastic film and the like, and as shown in Figure 8, it is formed in a flat cylindershape; the upper part of the storage sack has an opening (4a); the upper end (141a) of the fore side (141) of the opening (104a) is folded in a U-shape toward the rear side (142); and the upper end (142a) of the rear side (142) projects further than that of the fore side (141).

Furthermore, a pair of locking holes (104b) are provided at the projected portion upward.

The aforementioned box (105) is made of corrugated fiberboard; as shown in Figure 9, it is formed in the shape of a longitudinal rectangular parallel pipe. As shown in Figure 10, a pair of bar-shaped hangers (107, 107) are provided inside the upper part of said box (105) and said hangers (1007, 107) penetrate locking holes (104b) of said storage sack (104). Then the hanger (107) is installed to support plates (108a, 108b) fixed to the upper surface inside the box (105). Thus a number of storage sacks (104) can be suspended to retain a state such that the fore side (141) faces the left-hand side as shown in Figure 10.

A pressure plate (See Figure 12) is arranged on the rear face of the storage sacks (104); the pressure plate presses the storage sacks with an elastic member. In Figure 10, rubber bands (110) are applied as the elastic members; both ends of the rubber bands (110) are anchored to a hook (181) provided at both sides of the supporting plate (108a).

As shown in Figure 9, an opening (151) which can open along the perforating scores (105a) is provided on the front face of the box (105); the box (105) or the storage sacks (104) which are stored in the box are transferred and stored without opening the opening (51) when they are not used.

When they are used, as shown in Figure 11, after the opening (151) is open along with the perforating scores (105a), open the switch door (106) provided on the rear side of the device body (1011) to place the box (105) into the device body (1) being while opening the opening (151).

As shown in Figure 12, a box type fixed support member is integrally provided inside the device body (101) on the upper part of the box (105), placed in the device body; the positioning is done so as to contact the fore side of the fixed support

member (111) with the front face of said box (105).

According to the aforementioned embodiment shown in Figure 8 through Figure 12, the box (105) storing storage sacks for umbrellas is filled from the rear side to the device body (101), however, the box can be filled from the top of the device body (101) by configuring, for example, a cover (103) can be open.

In addition, as shown in Figure 13, a frame body (101b) can be applied as part of the device body to place the box (105) in the frame (101b) to determine the specified position to retain the box without covering up all faces of the box (105) by the device body (101). Besides, the opening (4a) of the storage sack (4) can be opened by actuating vacuum suction in the aforementioned prior embodiment without using the open control lever (22) to open the opening (4a) in accordance with the embodiment shown in Figure 1 to Figure 7.

The following explains the other embodiment in the present invention referring to Figure 14 through Figure 16. According to this embodiment, a pair of horizontal open control levers are structured to move and rotate independently.

In Figures 14 and 15, a left-hand side tension coil spring (224) is applied between a left-hand side rotation control arm (223) and said guide rail (216); a right-hand side tension coil spring is applied between a right-hand side rotation control arm (223) and said guide member (212). And as shown in Figures 14 and 16, contacting plates (225, 225) are integrally provided on said guide rail (216) and guide member (212); the contacting plates make each open control lever (222) to rotate it in the reverse direction toward a storage sack (4) by contacting with the rotation control arm (223) when each open control lever (222) moves lower together with a movable support member (214).

Tension coil spring is exemplified as a means of making each open control lever (222, 222) rotate toward storage sacks (204), however, for example, a helical spring can be applied as the means, as well.

With regard to a mechanism for opening storage sacks (204), redundant explanations on such a structure are skipped since the explanation according to Figure 7 is almost same. According to the embodiment shown in Figure 14s to 16, when the foot pedal (217) is depressed and the movable support member (214) lowers against a return spring (220) through a link (219), each open control lever (222) separately moves and rotates independently to the movable support member (214). Simultaneously, since springs (224), which move and rotate in the direction to press the open control levers (222, 222) toward the storage sacks, are separately applied horizontally, each open control lever (222) can be inserted into the opening (204a)

by lowering in a good state of contact with the front face of the upper rear end (242a) of the forefront storage sack (204) even some longitudinal misregistration of the opening (204a) in a direction across from the forefront storage sack (204) is generated.

In the aforementioned embodiment, the foot pedal is continuously pedaled until an umbrella stored in a storage sack is removed from the device body; when the foot pedal is released after the storage sack is taken out, the original condition will return by working a return spring to ascend the movable support member.

In addition, it can be structured such that the forefront storage sack maintains the opening by applying anchoring means to keep lowering the movable support member by depressing the foot pedal until the stored umbrella is taken out when the foot pedal is released; for example, as shown in Figure 16, a plurality of locking grooves (226) can be formed on the movable support member (214) and an anchoring claw (227) which hitches to said grooves can be applied to the guide member (213) integrally.

In this structure, when a foot pedal (217) is depressed to lower the movable support member (214), a locking groove (214a) formed on the movable support member (214) will hitch to the anchoring claw (227) as inclining the movable support member (214) to the anchoring claw (227). As a result, the opening (204a) of the storage sack (204) is kept to open by blocking the ascending motion of the movable support member (14) by the return spring (20) [Figure 17].

When an umbrella stored in a storage sack (204) opens the opening (204a) and the umbrella with a sack is removed from the device body, the movable support member (214) will incline in the direction to release the anchoring to an anchoring claw (227) through the open control lever (222). Next, the anchoring locking groove (214a) to anchoring claw (227) is released and the movable support member (214) automatically returns to the original position for ascending by elastic rebound of the return spring (220).

Figures 18 to 20 show the other embodiment of the present invention. In Figures 18(a) and 18(b), sign (328) shows a bucket-shaped member formed from plastic integrally. Umbrella insertion can be done easily and completely thanks to the shape of this bucket-shaped member (328). Open storage sacks (5) with bucket-shaped member (328) are shown in Figure 19s and 20, however, a detailed explanation is skipped because the state shown in Figure 19 and Figure 20 is almost similar to that in Figure 7(a) to 7(c). Furthermore, the aforementioned embodiment is just an example, therefore structural changes are possible within the purpose

of the present invention from time to time.

#### Effectiveness of the Invention

As mentioned above, according to the storage device for umbrella sacks of the present invention, an opening of a storage sack can be opened by operating the open control levers in connection with lowering a movable support member by depressing a foot pedal; and then, a wet umbrella can easily be stored by inserting it in the open opening of the storage sack.

In addition, since no motor or the like is used in the present invention, production costs can decrease and it can be used in locations where there are no nearby power sources. Furthermore, there is no problem of power cords being a hindrance and there is no danger of short circuits. Thus, this device proposed in the present invention is remarkably practical.

Furthermore, in the present invention, when a number of storage sacks are stored in a box being placed in the device body, many such storage sacks can easily be stored in the device collectively and rapidly. Additionally, since the storage sacks are stored in a box collectively, it is easy to carry and store even before the stored box is placed in the device.

In the present invention, when a pair of open control levers are separately structured to move and rotate independently relative to the movable support member, said open control levers can completely enter into and open said opening, although some misregistration of the opening is generated across the longitudinal direction of the storage sack.

#### Claims

1. A storage device for umbrella sacks comprising: a device body stored in a plurality of storage sacks for umbrellas; a movable support member arranged in the device body so as to be vertically movable; a foot pedal making said movable support member move lower; open control levers which open the openings of storage sacks in connection with the descending motion of said movable support member.
2. A storage device for umbrella sacks according to claim (1) wherein a number of storage sacks are firstly stored in a box, and then the box is placed in the device body.
3. A storage device for umbrella sacks according to claim (2) wherein said large number of storage sacks are suspended by a hanger in said

box to retain them.

4. A storage device for umbrella sacks according to claim (1), (2) or (3), wherein a pair of open control levers are separately provided to move and rotate independently against said movable support member; and means for rotating each of said open control levers to a direction, in which direction each of said levers contacts with said storage sack, are separately provided. 5 10
5. A storage device for umbrella sacks according to claims (1) to (3) wherein said open control levers are comprised of bucket-shaped members being formed integrally. 15

20

25

30

35

40

45

50

55



Fig. 1

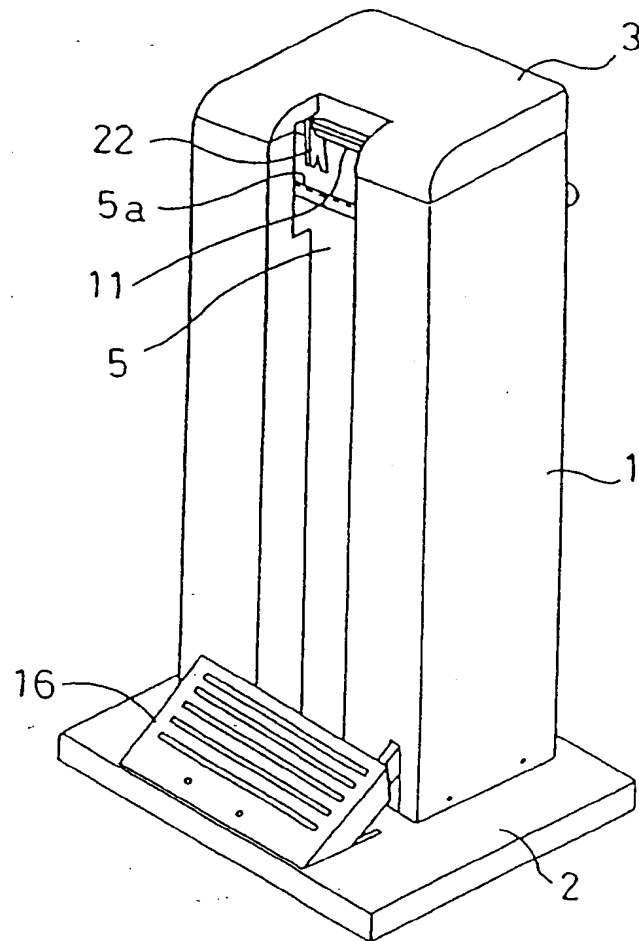


Fig. 2

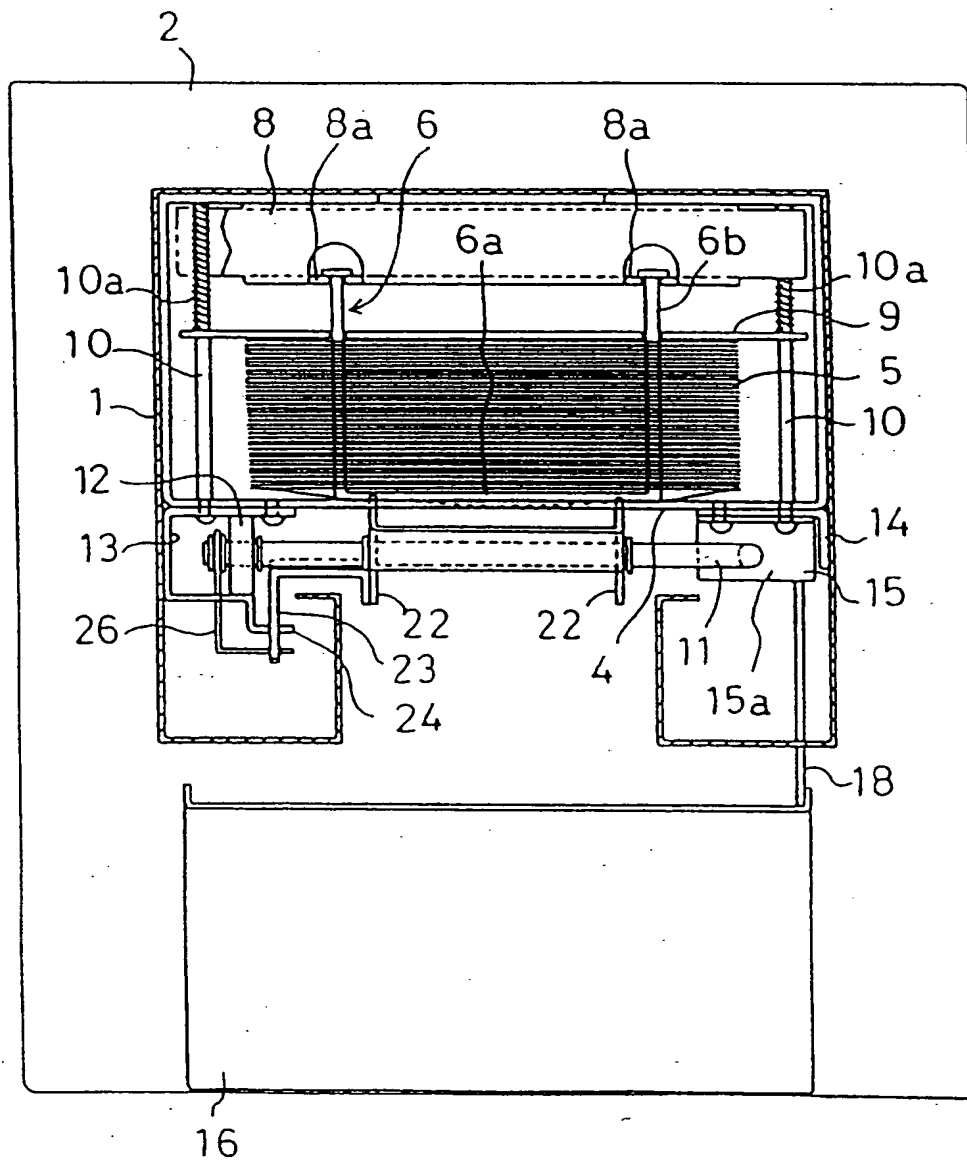


Fig. 3

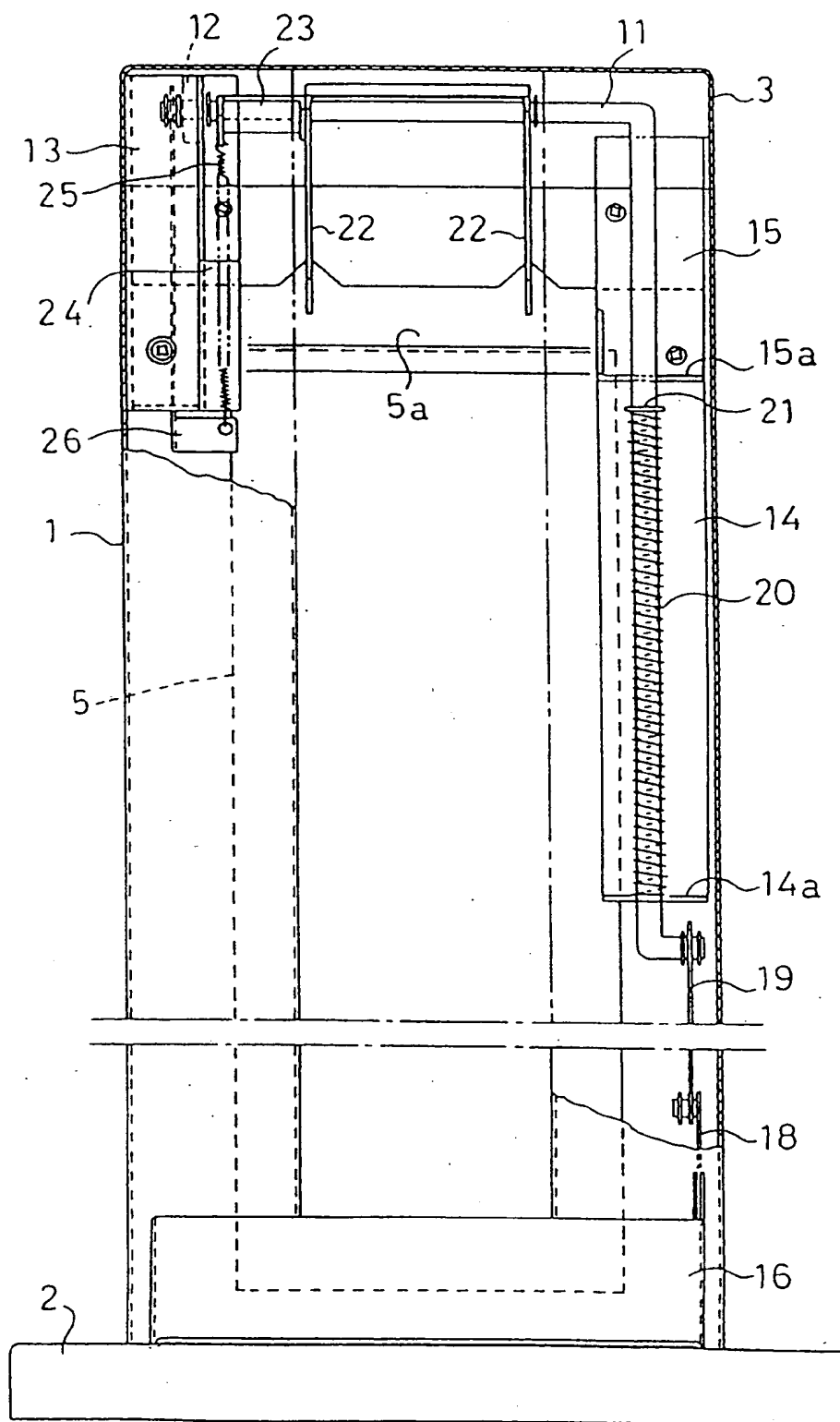


Fig. 4

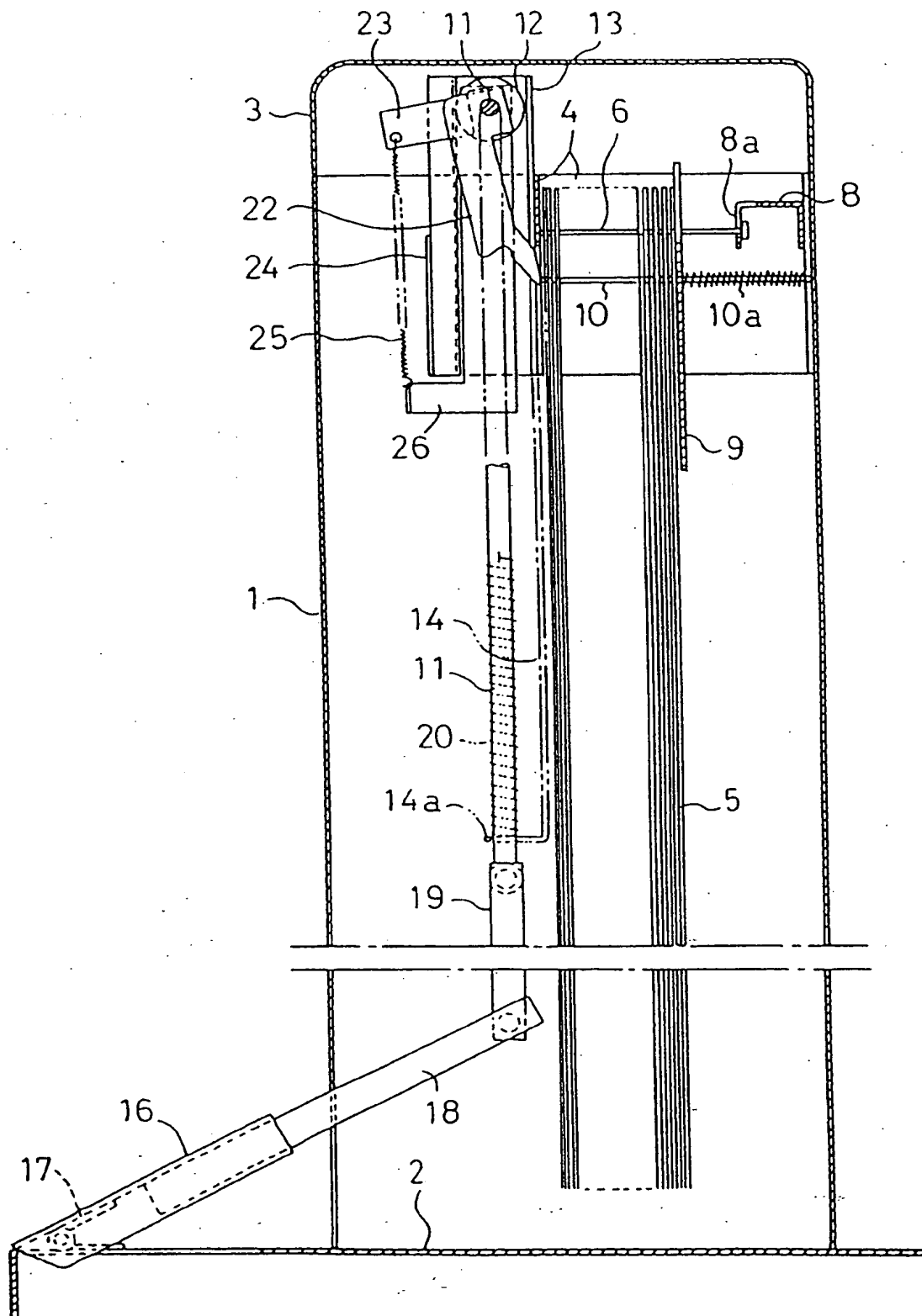


Fig. 5

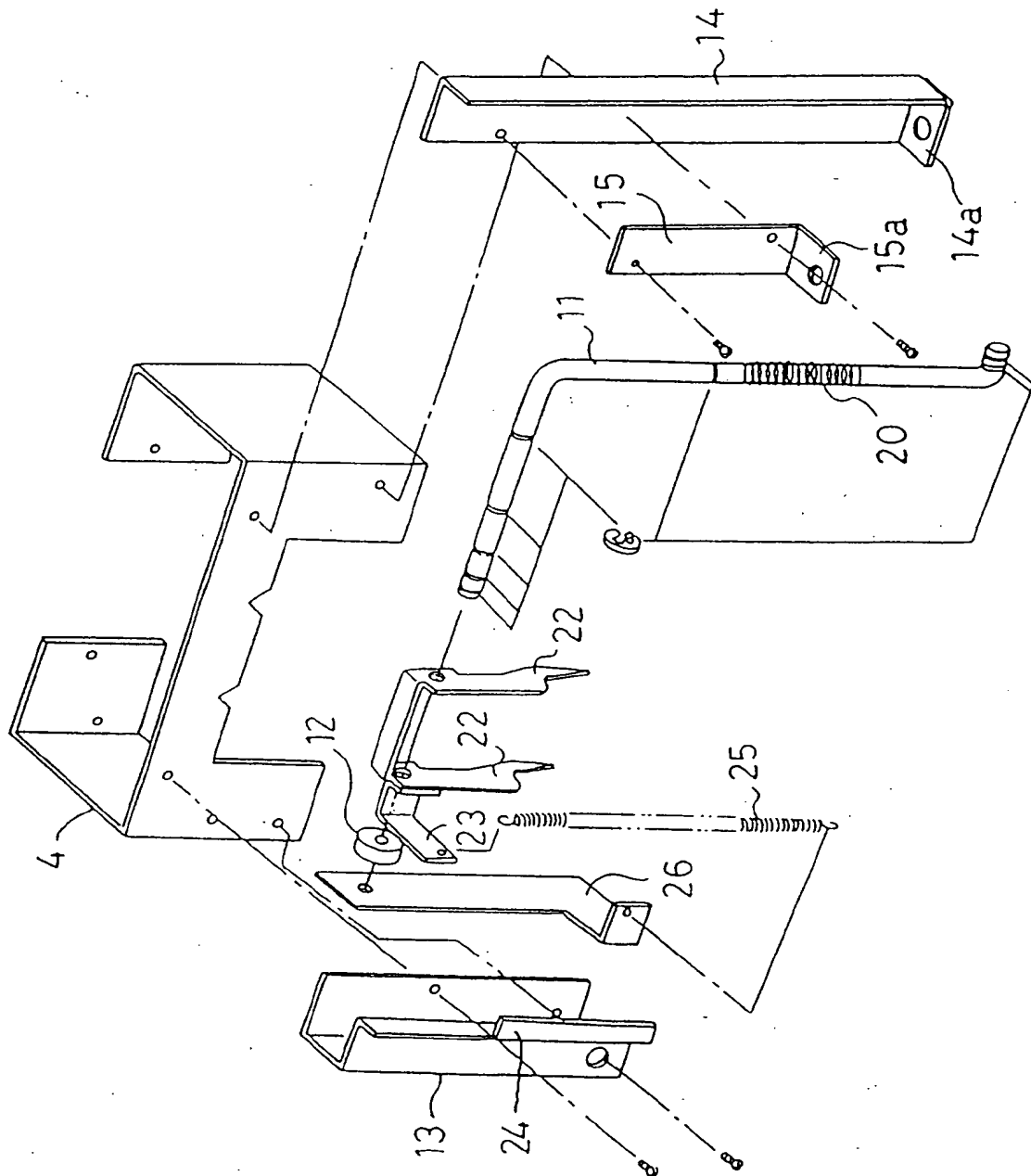


Fig. 6

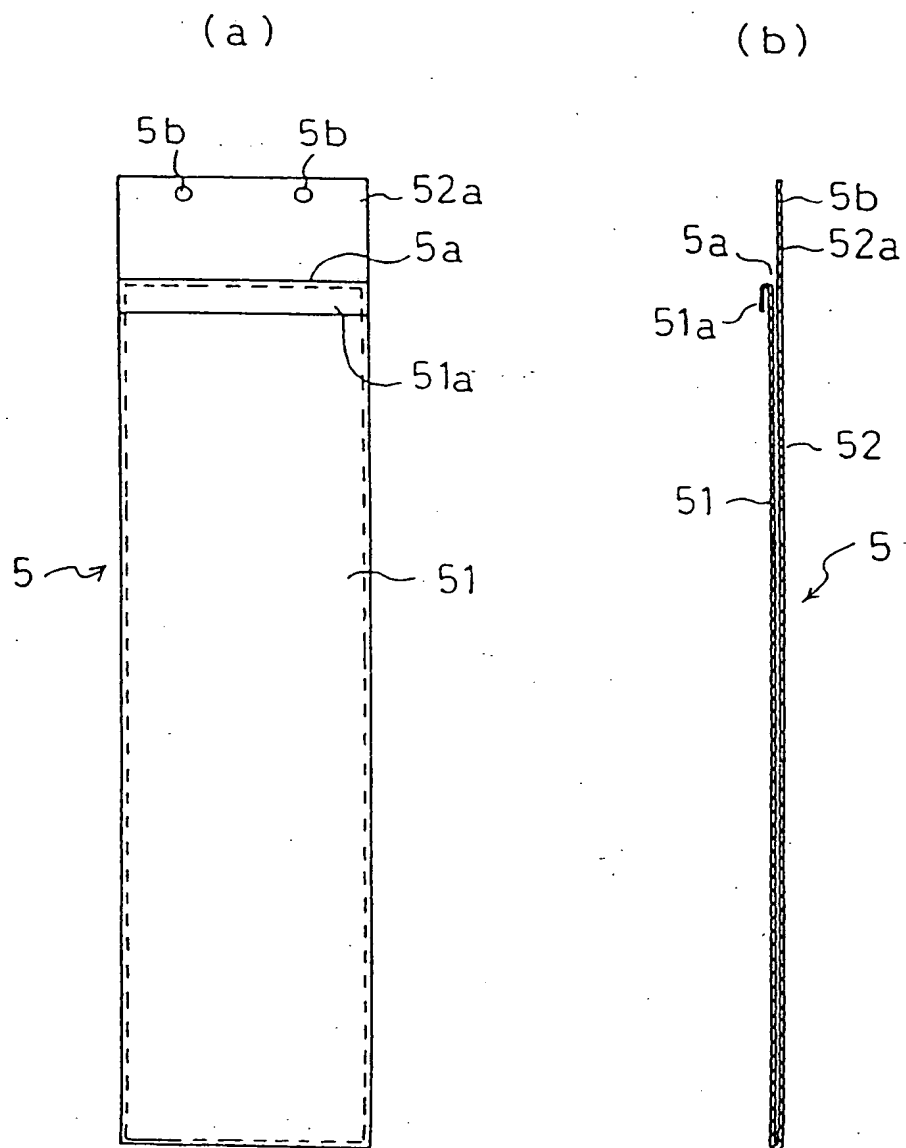


Fig. 7

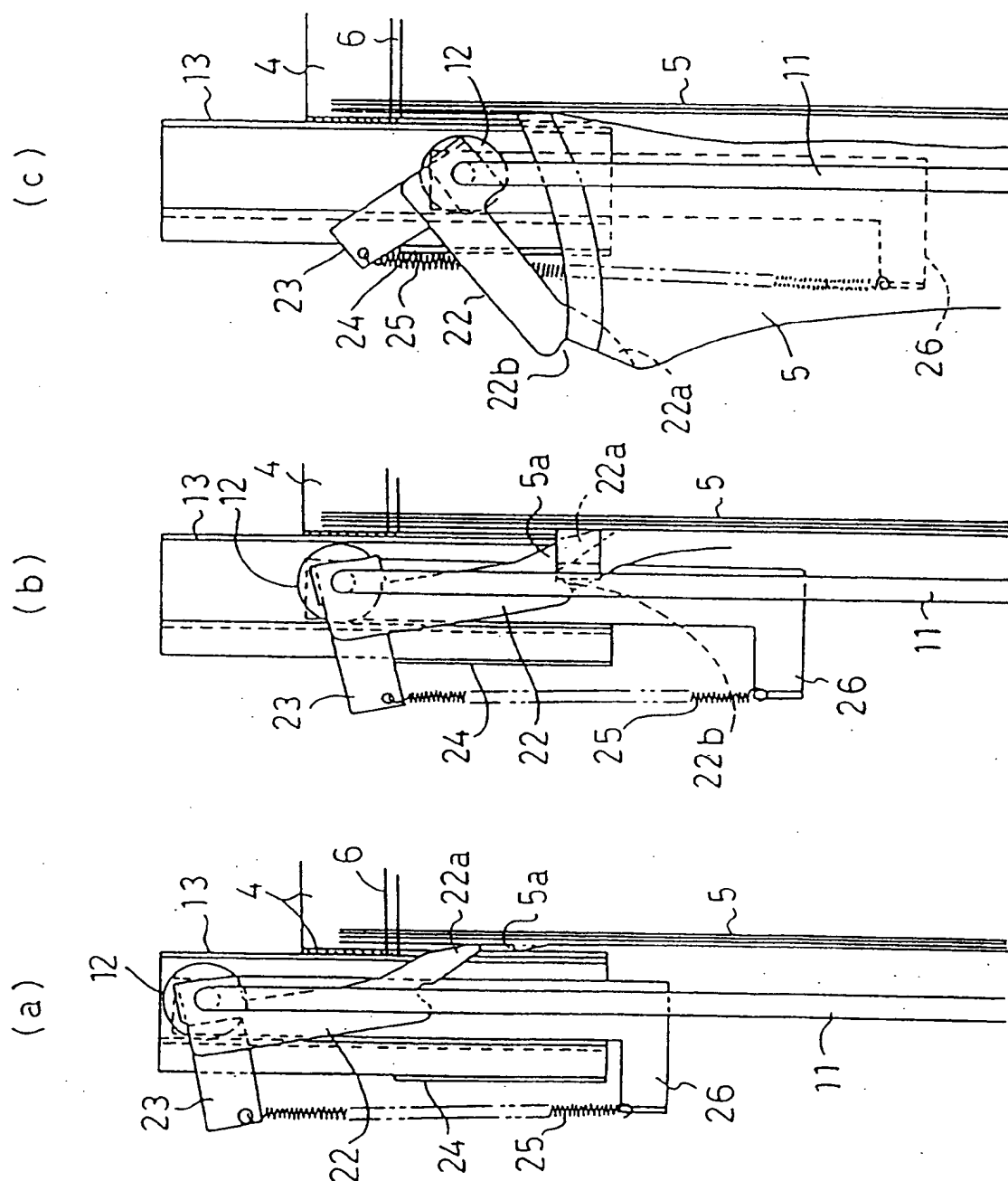


Fig. 8

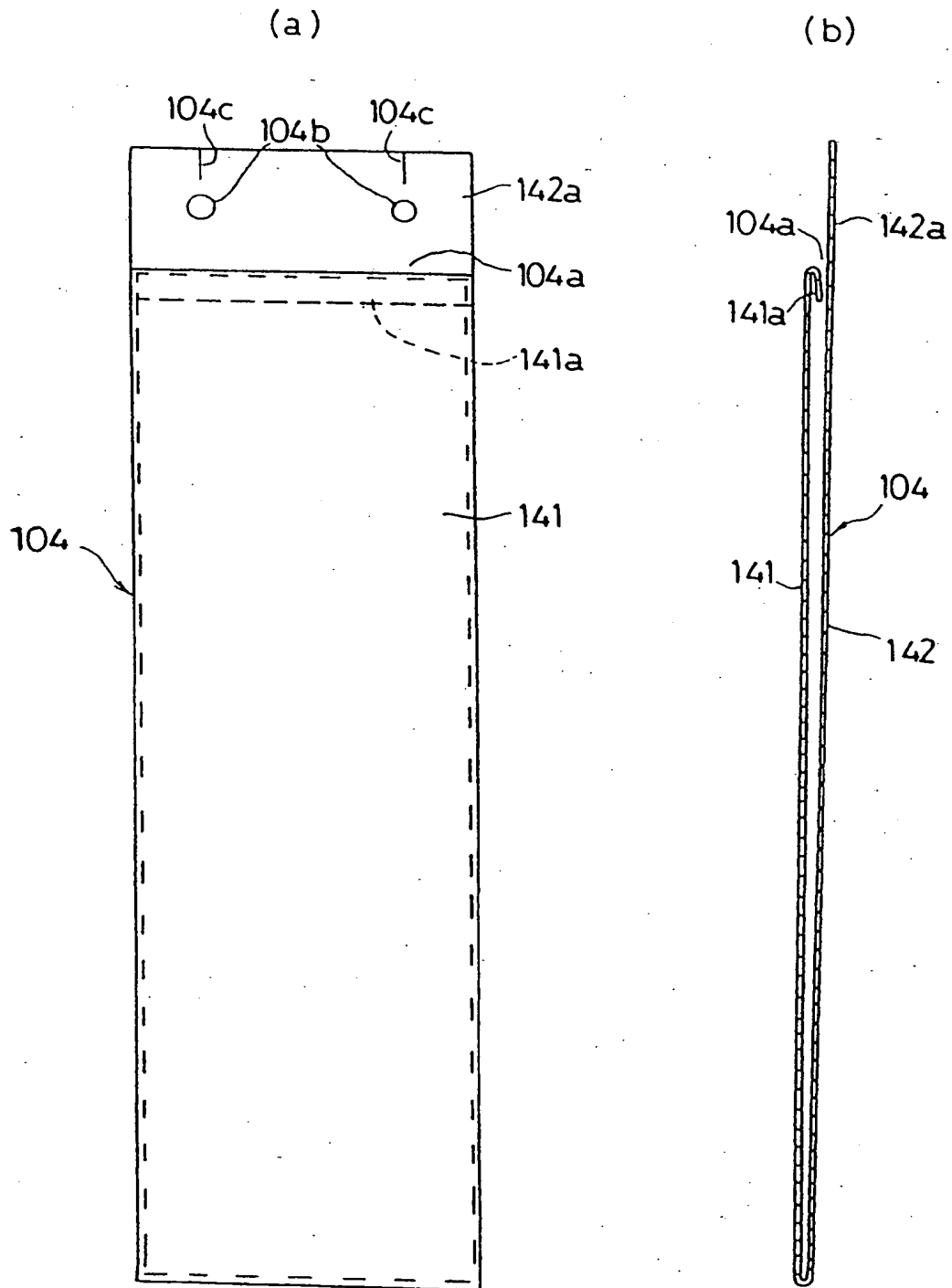




Fig. 9

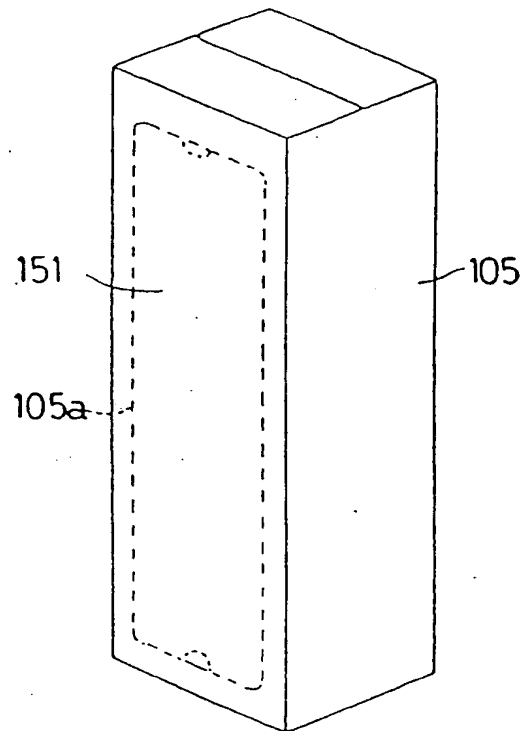


Fig. 10

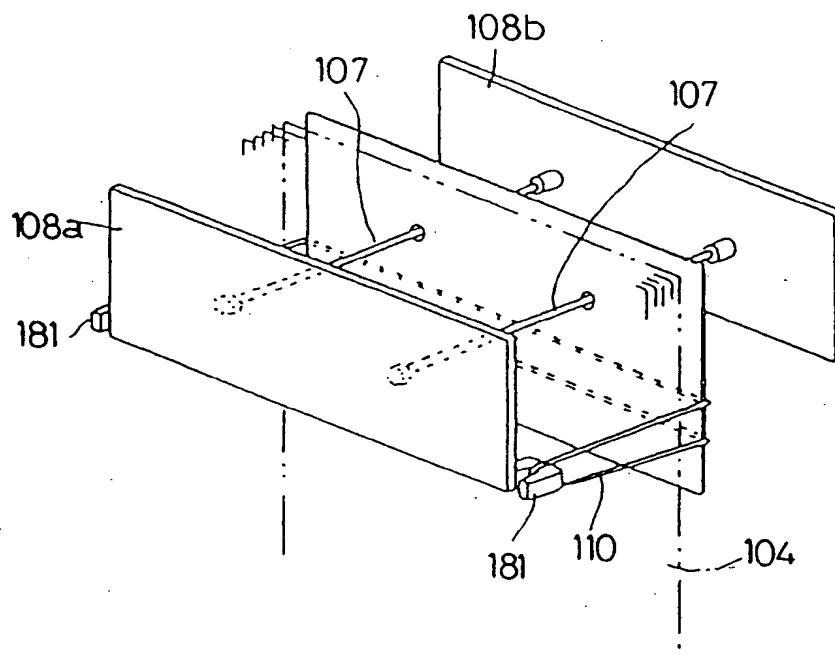


Fig. 11

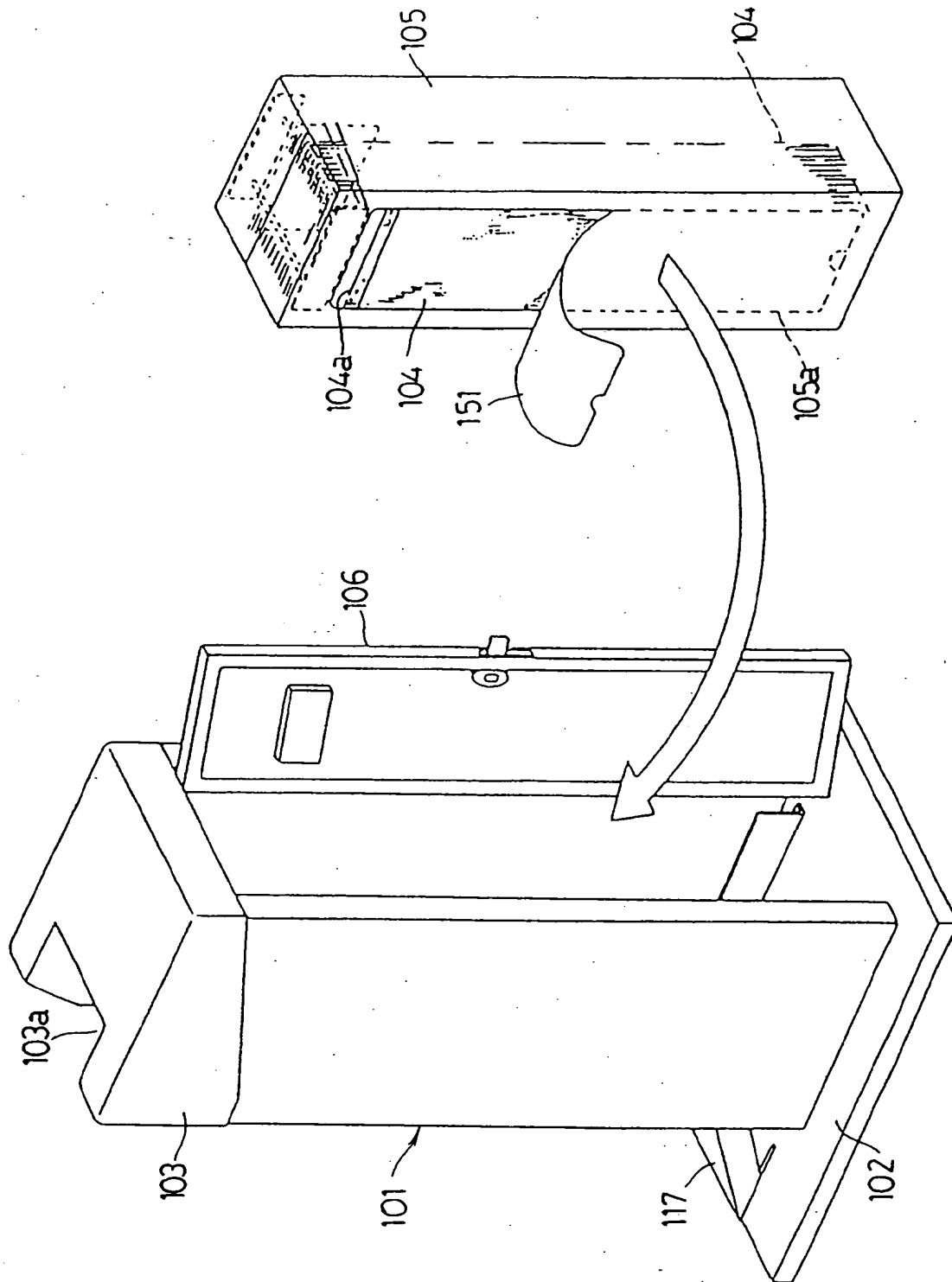


Fig. 12

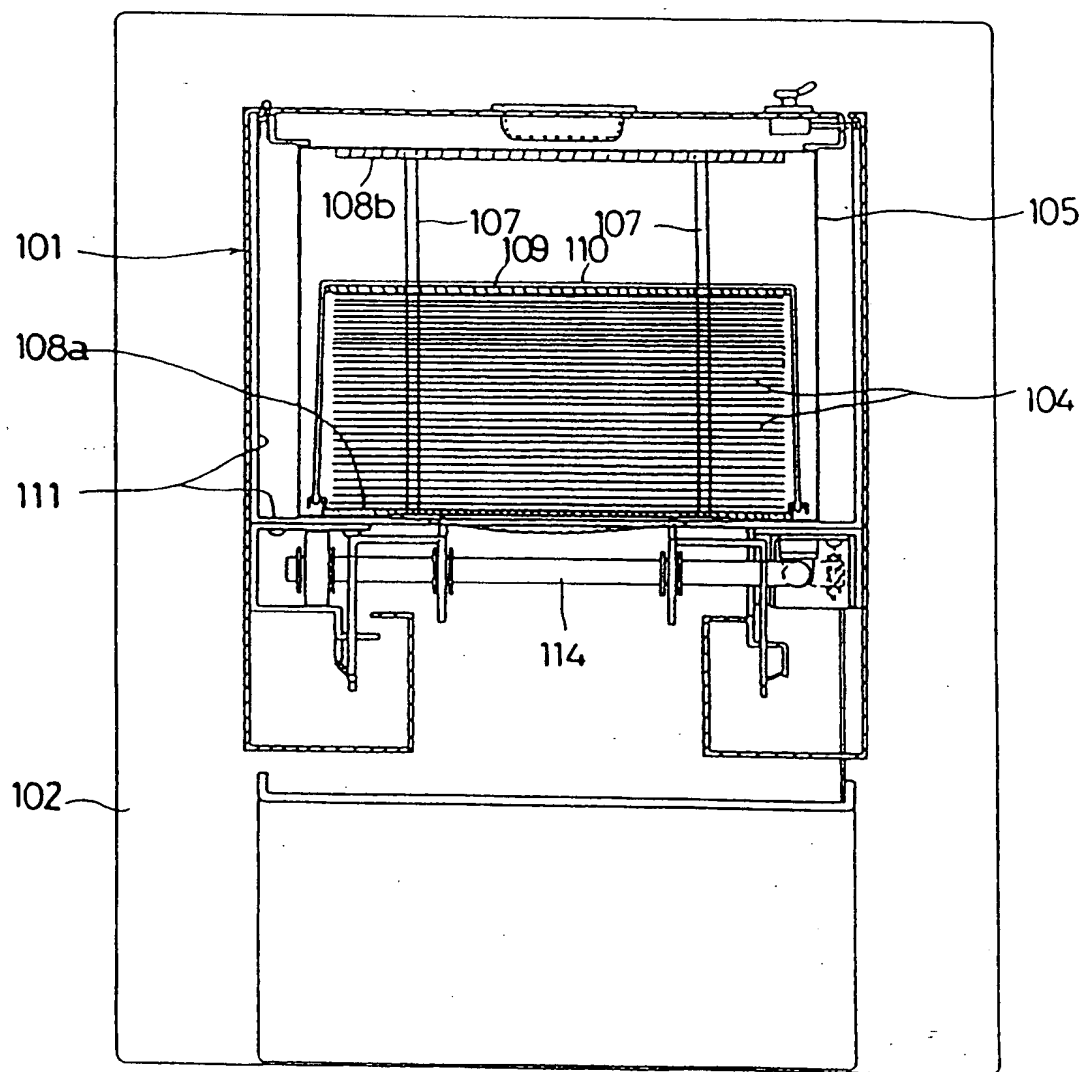


Fig. 13

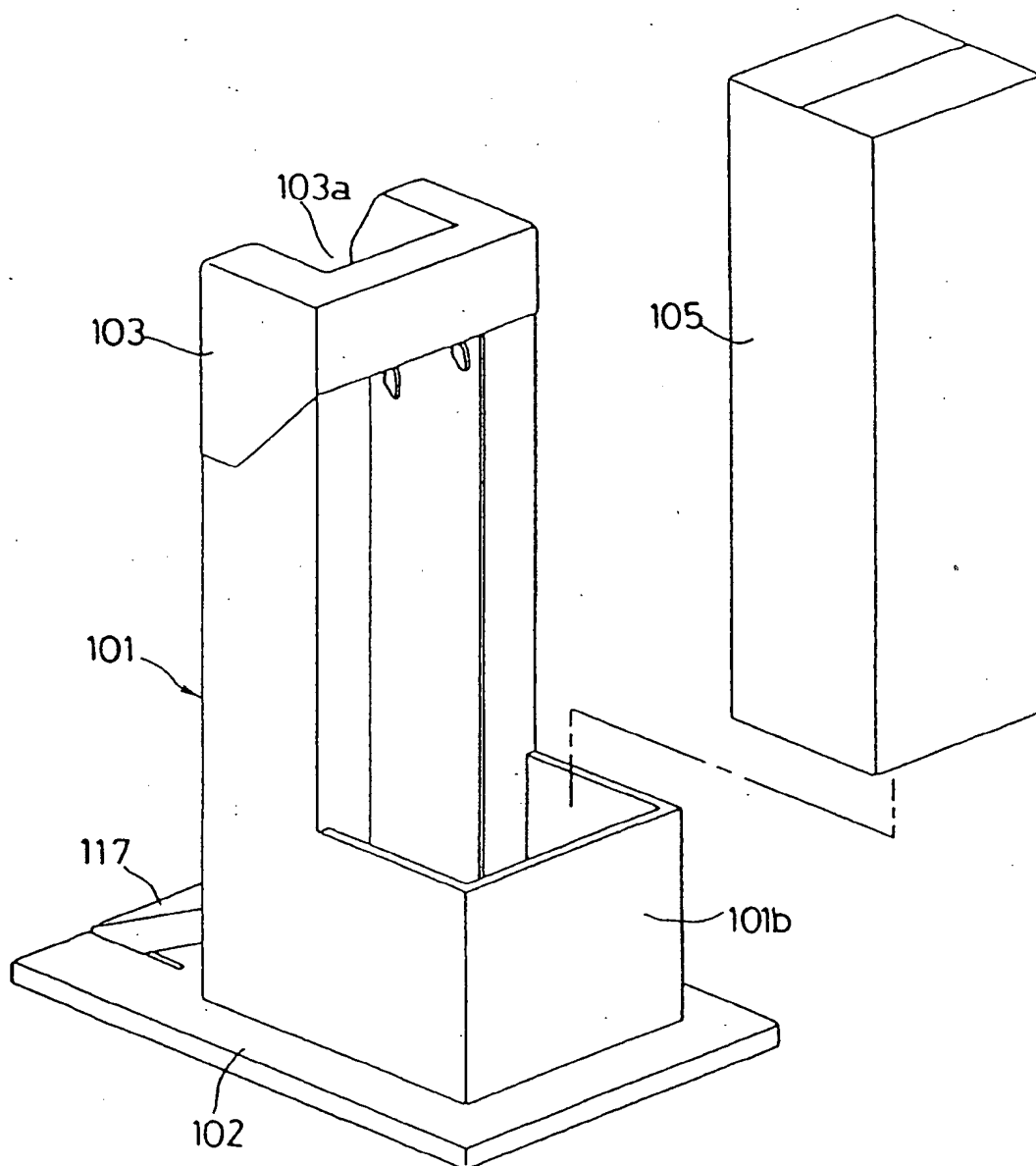


Fig. 14

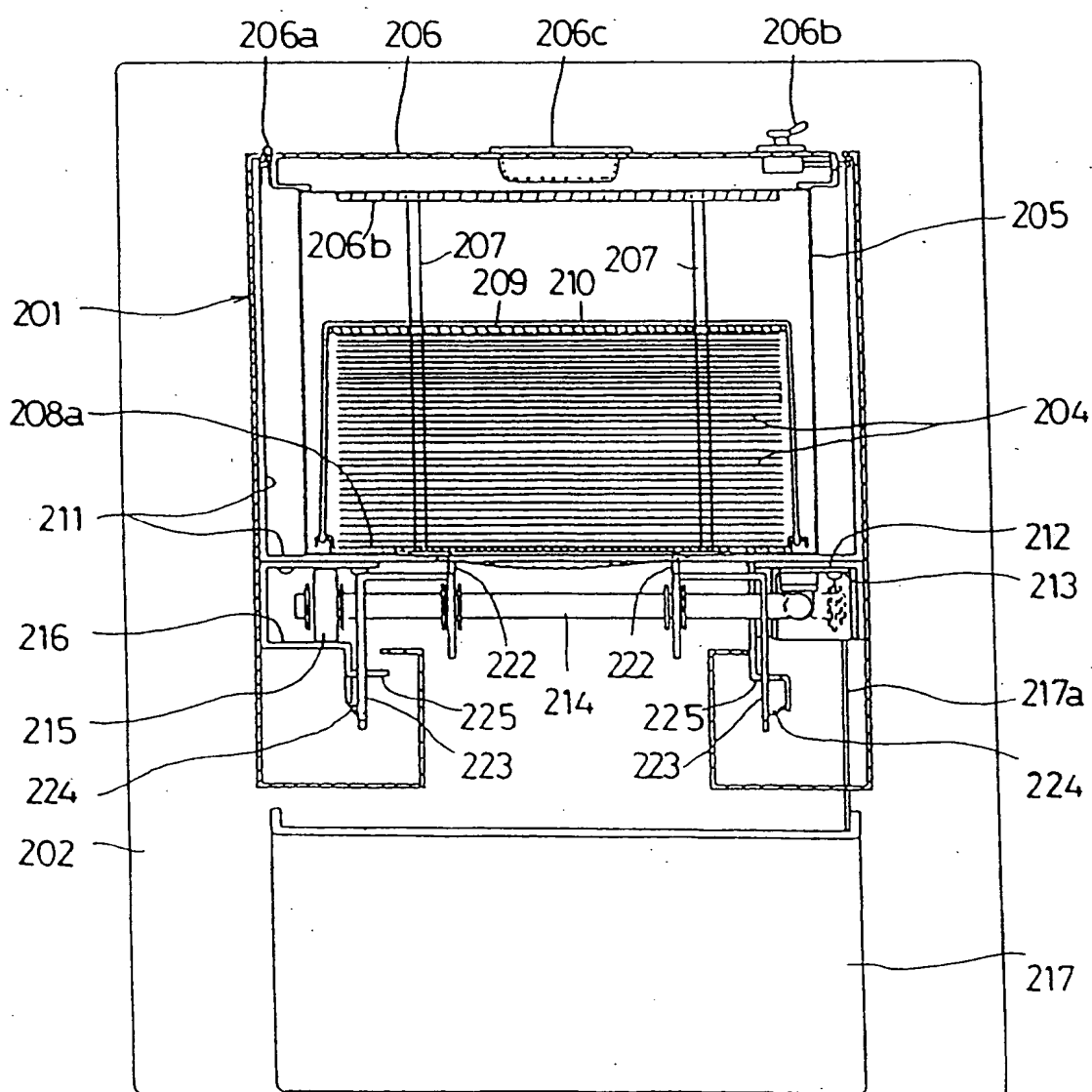


Fig. 15

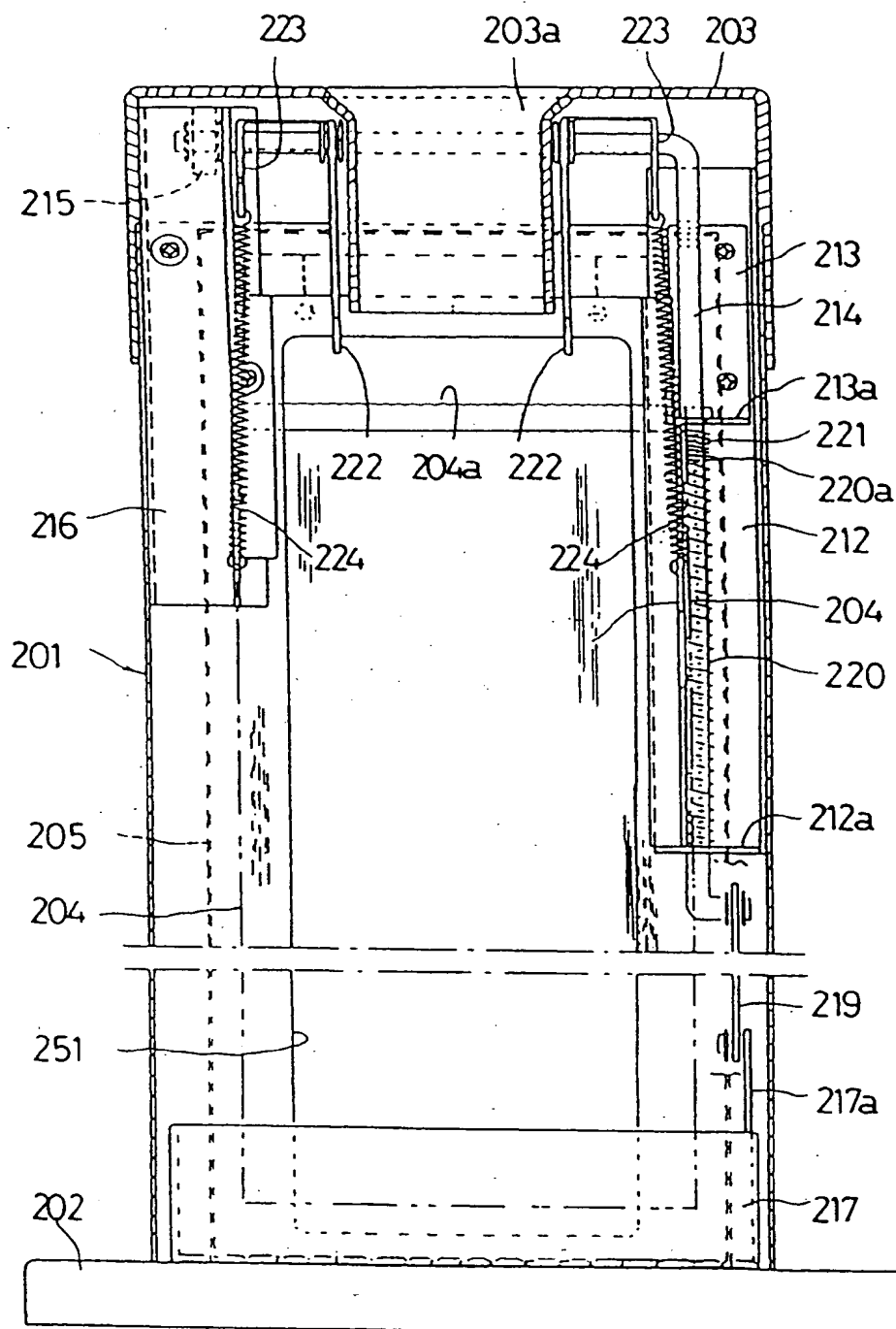


Fig. 16

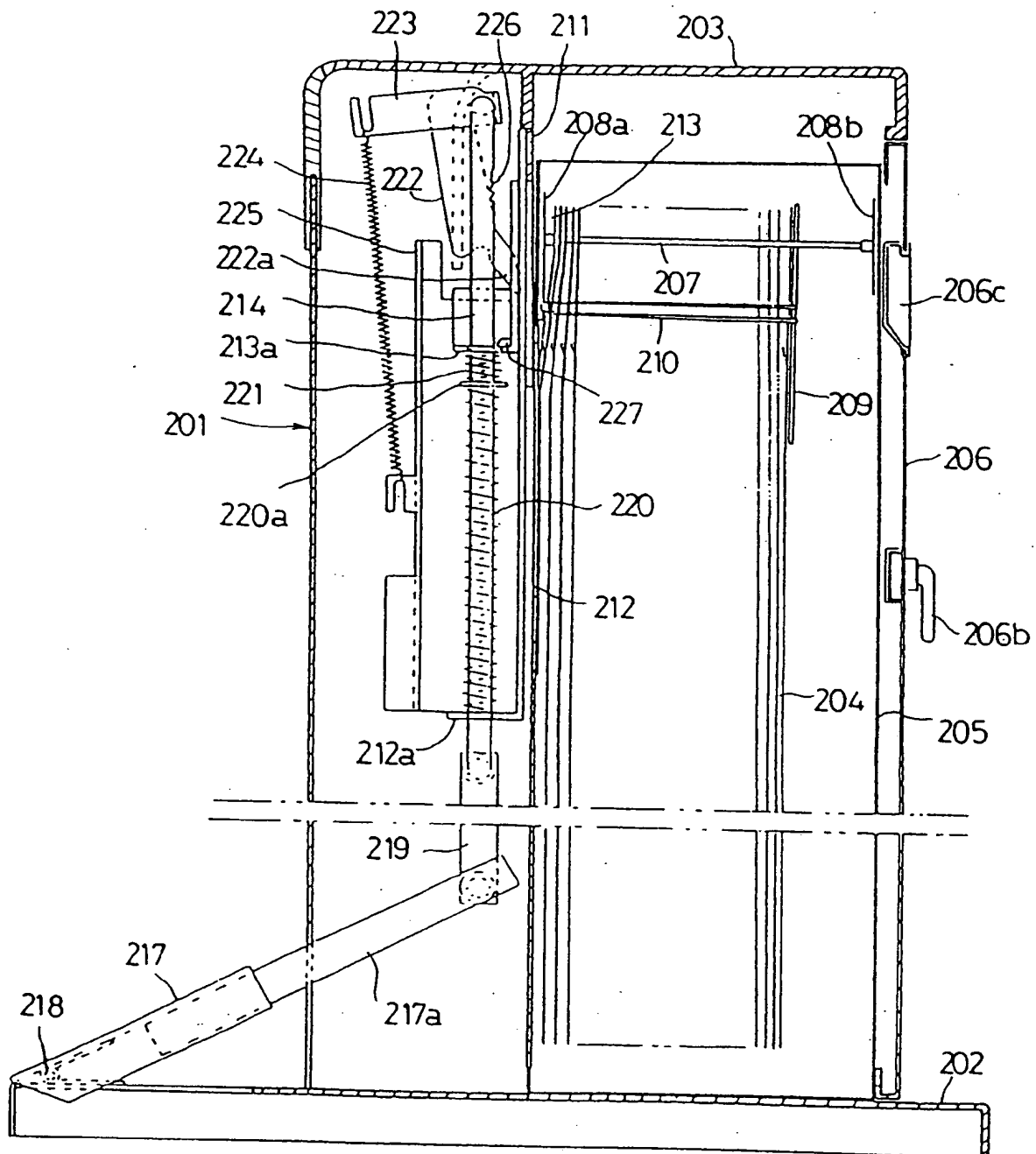


Fig. 17

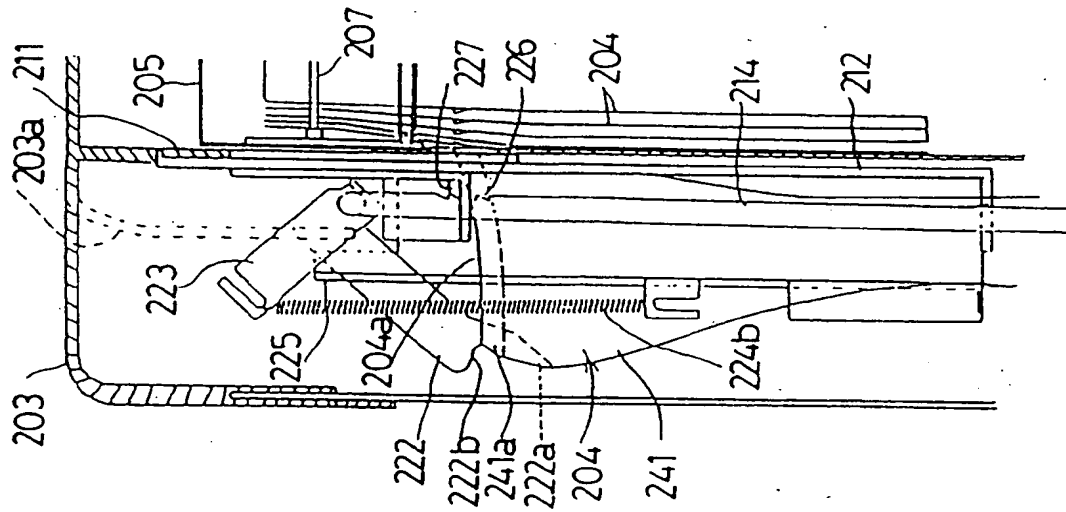


Fig. 18

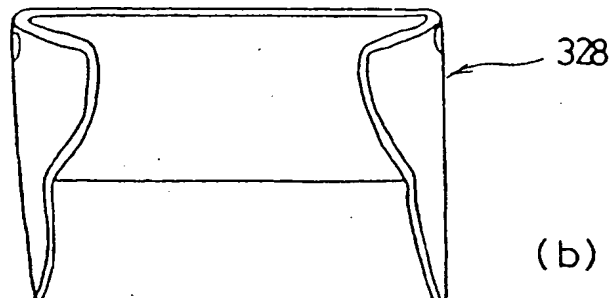
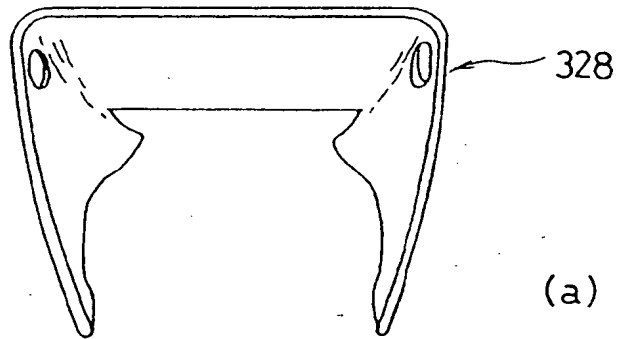




Fig. 19

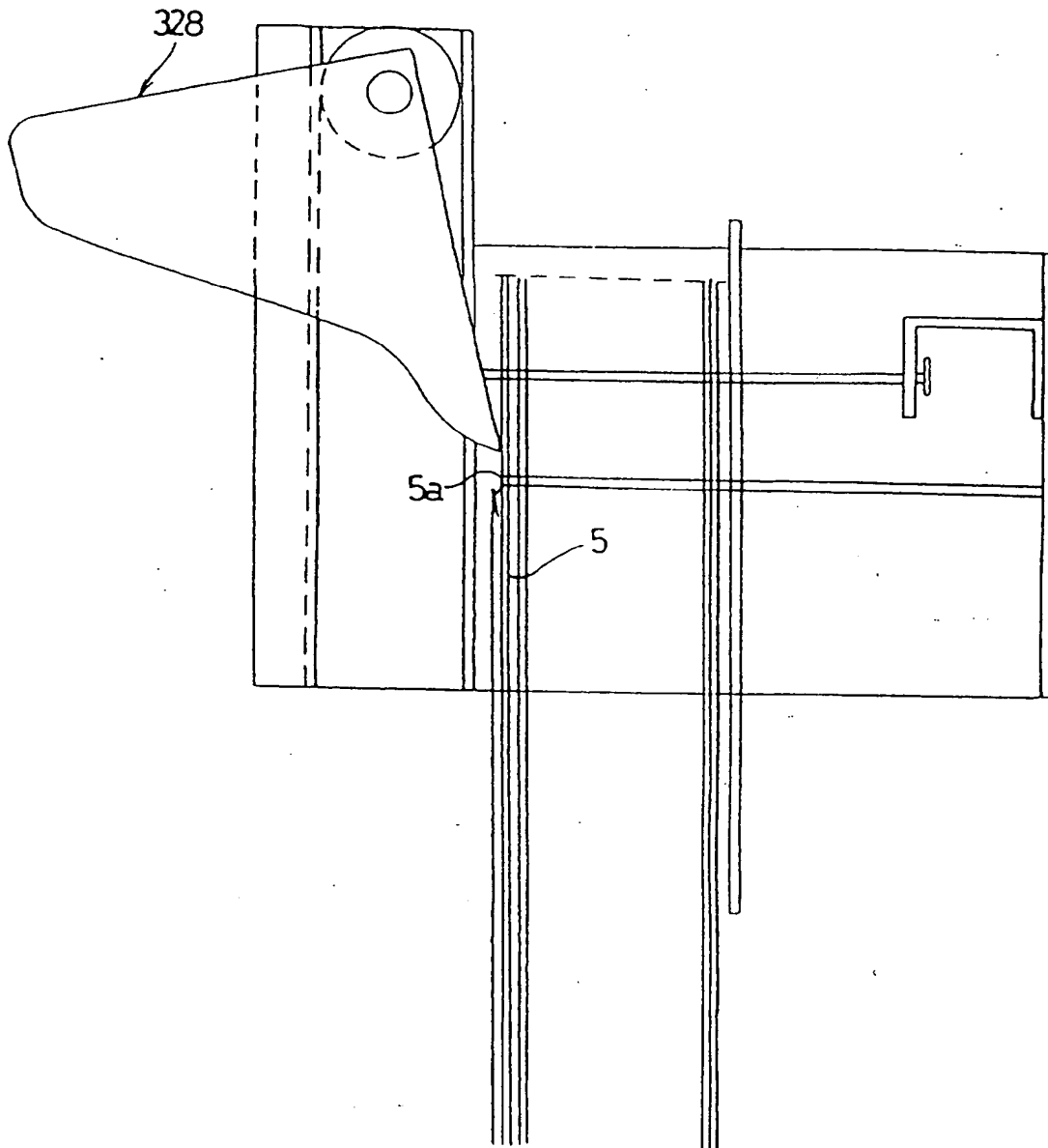
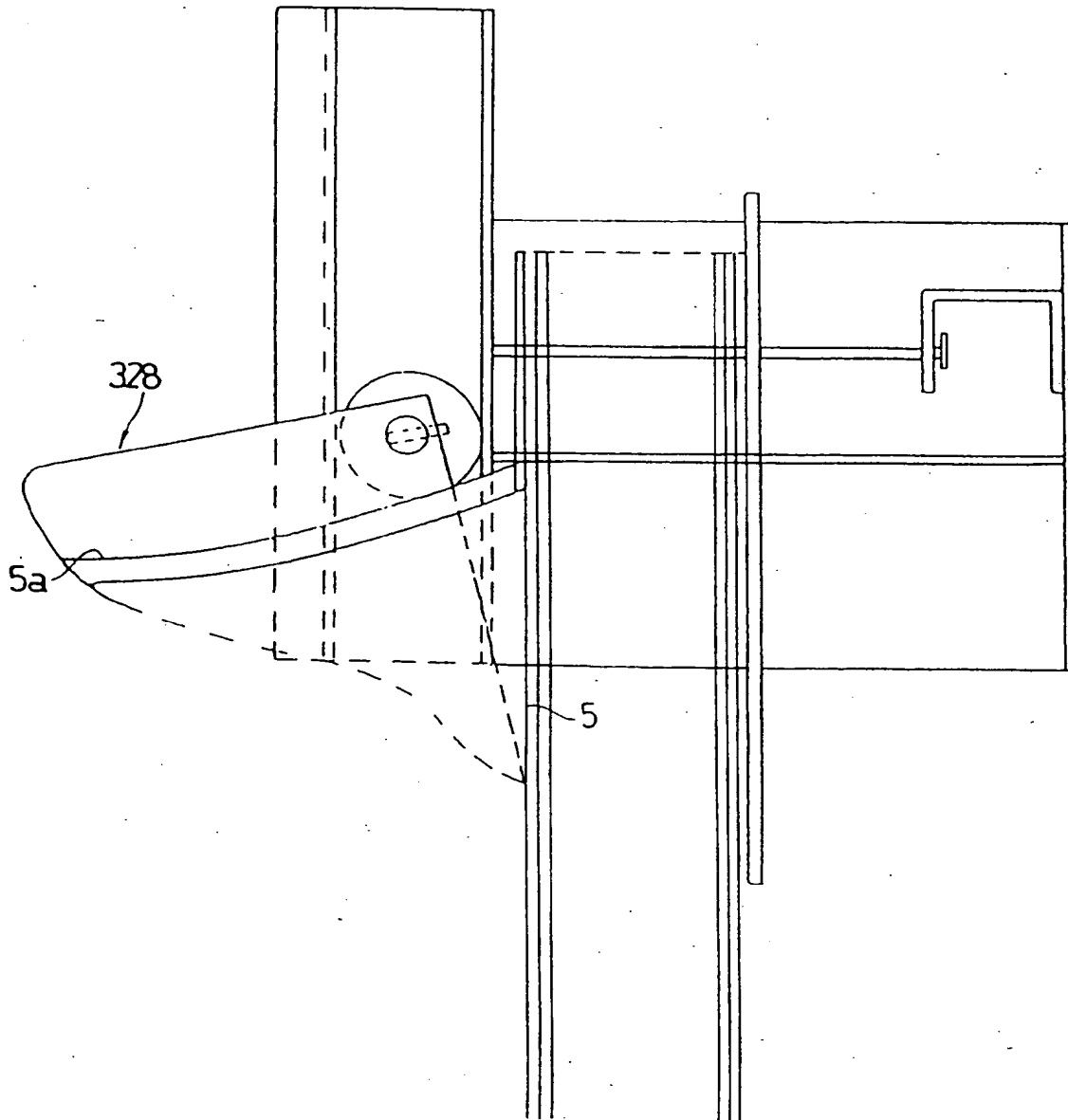


Fig. 20



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP93/01852

## A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl<sup>5</sup> B65B67/12

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int. Cl<sup>5</sup> A45B25/24-25/28, B65B43/12-43/36, 67/00-67/12,  
B65D30/00-30/28, 33/00-33/38

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1925 - 1993  
Kokai Jitsuyo Shinan Koho 1971 - 1993

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP, U, 5-7611 (Yamada Kikai Kogyo K.K.), February 2, 1993 (02. 02. 93), Lines 6 to 20, page 6, (Family: none)	1-5
Y	JP, A, 4-31229 (Junichi Takimoto), February 3, 1992 (03. 02. 92), Lines 2 to 16, upper right column, page 4, (Family: none)	1-5
A	JP, U, 1-124120 (Taiji K.K.), August 23, 1989 (23. 08. 89), Fig. 4, (Family: none)	1
A	JP, A, 60-134817 (Toshikatsu Tazaki), July 18, 1985 (18. 07. 85), (Family: none)	1
A	JP, U, 58-149914 (Taro Oizuki), October 7, 1983 (07. 10. 83), (Family: none)	1
A	JP, U, 4-95720 (Yamada Kikai Kogyo K.K.), August 19, 1992 (19. 08. 92),	1

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

March 7, 1994 (07. 03. 94)

Date of mailing of the international search report

April 5, 1994 (05. 04. 94)

Name and mailing address of the ISA/

Japanese Patent Office

Facsimile No.

Authorized officer

Telephone No.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP93/01852

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Fig. 2, (Family: none)	
Y	JP, Y2, 53-15670 (Nogyo Kikaika Kenkyusho), April 25, 1978 (25. 04. 78), Lines 6 to 14, column 3, (Family: none)	1-5
Y	JP, B2, 55-28940 (Bengto Rundin AB.), July 31, 1980 (31. 07. 80), Fig. 1 & US, A, 3,967,775 & US, A, 4,044,890	1-5